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Cyclopoid Copepods (Lichomolgidae) Associated with Hydroids in the Tropical Western Pacific Ocean[1]

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ABSTRACT: Eight poecilostome copepods, two of them new, are reported from shallow-water hydroids at various points around Banda, Ceram, and Halmahera in the Moluccas and near Noumea in New Caledonia. From *Aglaophenia cupressina* Lamouroux: *Macrochiron angulare* n. sp.; *M. cheliferum* (Thompson & A. Scott, 1903); *M. valgum* Humes, 1966; *M. vervoorti* Humes & De Maria, 1969; and *Telestacicola sertus* n. sp. From *Lytocarpus balei* Nutting: *M. lobatum* Humes & De Maria, 1969. From *Lytocarpus philippinus* (Kirchenpauer): *M. lytocarpi* Humes, 1966 and *M. rostratum* Humes, 1966. These records comprise two new hosts and five range extensions from Madagascar.

COPEPODS OF THE GENUS *Macrochiron* Brady, 1872, are primarily associates of hydroids. From the Pacific Ocean only one species, *M. cheliferum* (Thompson & A. Scott, 1903), has been recorded (Vervoort 1964), but six species are known from Madagascar (Humes 1966, Humes and De Maria 1969).

The eight copepods reported here comprise a new *Macrochiron*, a new *Telestacicola* (the first record of this genus from hydroids), and six species of *Macrochiron*, all representing range extensions and two of them being new host records.

MATERIALS AND METHODS

All measurements were made from specimens in lactic acid. The figures were drawn with the aid of a camera lucida. The letter after the explanation of each figure refers to the scale at which it was drawn. The abbreviations used are: A_1 = first antenna, A_2 = second antenna, Mx_2 = second maxilla, MXPD = maxilliped, P_1 = leg 1, P_4 = leg 4, P_5 = leg 5, Exp = exopod, and Enp = endopod. In formulas for the armature the Roman numerals represent spines and the Arabic numerals indicate setae.

FAMILY LICHOMOLGIDAE KOSSMANN, 1877

Genus *Macrochiron* Brady, 1872
Macrochiron angulare n. sp.

Figures 1–3.

Type Material

From the hydroid *Aglaophenia cupressina* Lamouroux, 309 ♀♀ and 180 ♂♂ in 3 meters, southwestern shore of Goenoeng Api, Banda Islands, 4°31′45″ S, 129°51′55″ E, 4 May 1975. Holotype ♀, allotype, and 481 paratypes (305 ♀♀, 176 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Other Specimens (all from Aglaophenia cupressina)

In 4 meters, 1 ♀, 1 ♂, Marsegoe Island, western Ceram, 2°59′30″ S, 128°03′30″ E, 15 May 1975; 70 ♀♀, 22 ♂♂, in 3 meters, Karang Mie, Halmahera, 0°20′07″ N, 128° 25′00″ E, 19 May 1975; 7 ♀♀, 5 ♂♂, in 2 meters, Parang Island, eastern Ceram, 3°17′ 00″ S, 130°44′48″ E, 23 May 1975.

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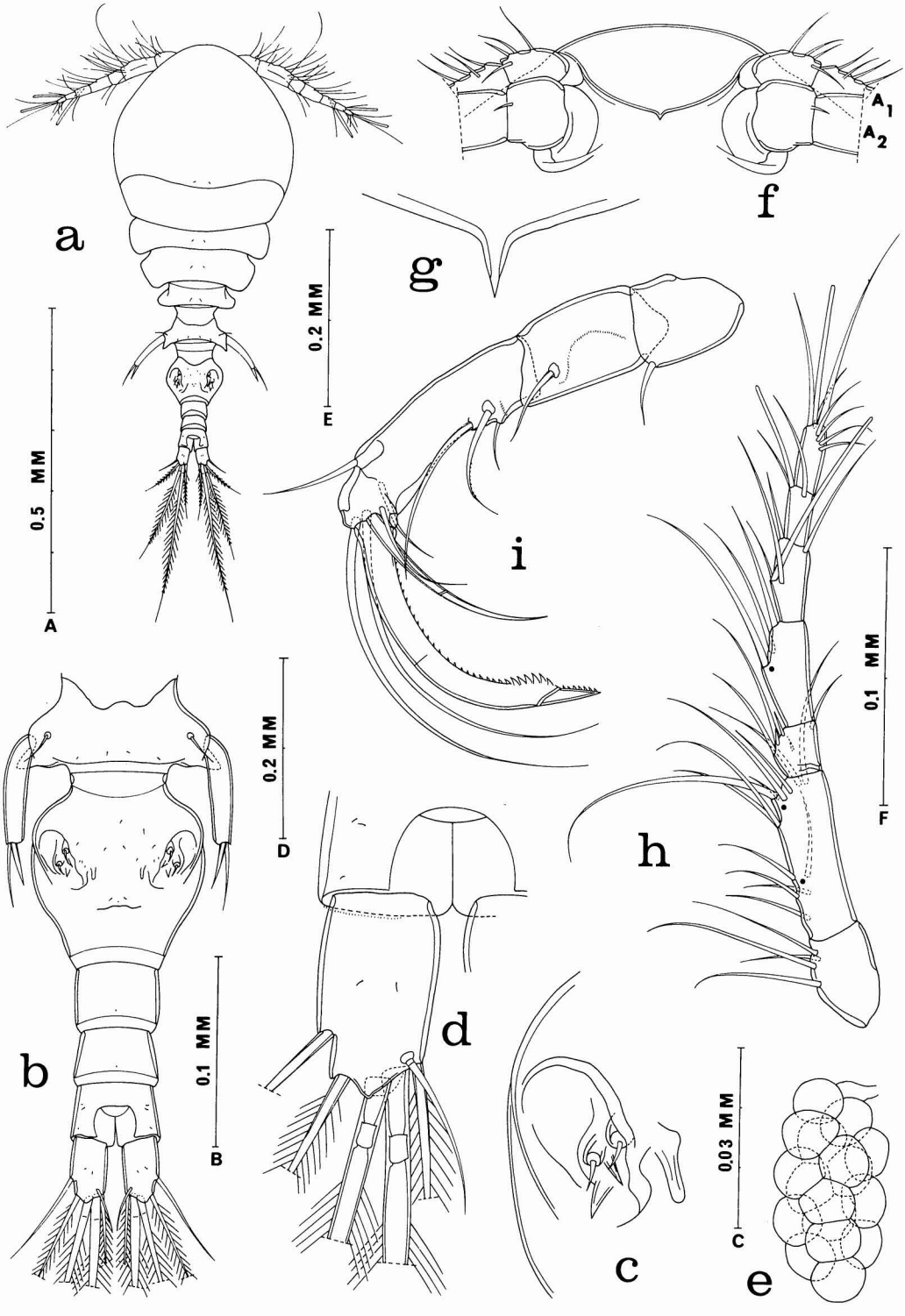

FIGURE 1. *Macrochiron angulare* n. sp. Female: *a*, dorsal (A); *b*, urosome, dorsal (B); *c*, genital area, dorsal (C); *d*, caudal ramus, dorsal (C); *e*, egg sac, dorsal (D); *f*, rostrum, ventral (B); *g*, tip of rostrum, ventral (E); *h*, first antenna, with three dots indicating positions of aesthetes added in male, ventral (F); *i*, second antenna, inner (F).

Female

Body (Figure 1*a*) with moderately broad prosome. Length 0.66 mm (0.63–0.70 mm) and greatest width 0.30 mm (0.26–0.31 mm), based on ten specimens in lactic acid. Weak transverse furrow dorsally between cephalosome and segment of leg 1. Ratio of length to width of prosome 1.46:1. Ratio of length of prosome to that of urosome 1.65:1.

Segment of leg 5 (Figure 1*b*) 50 × 95 μm. Genital segment 94 × 86 μm in dorsal view, broadest anteriorly, and tapering posteriorly. Genital areas located anterior to middle of segment. Each genital area (Figure 1*c*) with two small setae about 7 μm long and two spiniform processes. Three postgenital segments from anterior to posterior 32 × 42, 28 × 40, and 29 × 42 μm. Posteroventral margin of anal segment with very small spinules.

Caudal ramus (Figure 1*d*) elongate, 33 × 18 μm. Ratio of length to width 1.83:1. Outer lateral seta 44 μm and dorsal seta 25 μm; both smooth. Outermost terminal seta 91 μm, innermost terminal seta 86 μm, and two long median terminal setae 180 μm (outer) and 268 μm (inner); both inserted between small dorsal and ventral flanges; all four setae with lateral spinules.

Body surface with only a few hairs (sensilla) and refractile points.

Egg sac (Figure 1*e*) oval, 242 × 120 μm, containing approximately 17 eggs, each about 52 μm in average diameter (range 47–57 μm).

Rostrum (Figure 1*f*) broad with median point on posteroventral margin (Figure 1*g*).

First antenna (Figure 1*h*) 215 μm long. Lengths of seven segments (measured along their posterior nonsetiferous margins): 18 (37 μm along anterior margin), 53, 17, 37, 28, 19, and 24 μm, respectively. Formula for armature: 4, 13, 6, 3, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All setae naked.

Second antenna (Figure 1*i*) 166 μm long (without claws), three-segmented. Formula: 1, 1, 3, 2 claws + 5. Second segment with inner surface ornamented with a recurved inner row of minute spinules. Third segment with greatest length 91 μm, bearing proximally a short transverse row of very small spinules. Two terminal claws unequal. Larger claw serrate along concave margin, incompletely divided midway, and jointed distally. Inner claw slender, jointed midway, and smooth. All setae naked except one proximal seta on third segment which is unilaterally barbed.

Labrum (Figure 2*a*) with two broad posteroventral lobes.

Mandible (Figure 2*b*) resembling that of *Macrochiron vervoorti* Humes & De Maria, 1969. Paragnath a small lobe with a few short hairs. First maxilla (Figure 2*c*) with four setae. Second maxilla (Figure 2*d*) and maxilliped (Figure 2*e*, *f*) similar to those in *M. vervoorti*, but distal segment of maxilliped a little shorter and less bowed than in that species.

Ventral area between maxillipeds and first pair of legs as in Figure 2*g*.

Legs 1–4 (Figures 2*h*, *i*, *j*, 3*a*) with the same segmentation and spine and setal formula as in *M. vervoorti*. Leg 4 with inner coxal seta 9 μm and naked. Inner margin of basis smooth. Exopod 117 μm, third segment with II, 1, 5. Endopod 36 × 10.5 μm, its two terminal fringed spines 21 μm (outer) and 36 μm (inner). Outer margin of endopod with slight indentation and haired.

Leg 5 (Figure 3*b*) with unornamented free segment 57 × 10.5 μm. Ratio of length to width about 5.43:1. Two terminal setae 26 μm and fringed along one side and 39 μm and smooth. Dorsal seta approximately 15 μm. Body segment carrying leg 5 forming a pointed process extending ventrally to free segment of leg (Figure 3*c*).

Leg 6 represented by two setae on genital area (Figure 1*c*).

Color in living specimens in transmitted light opaque gray, eye red, egg sacs gray.

Male

Body (Figure 3*d*) a little more slender than in female. Length 0.59 mm (0.56–0.62 mm) and greatest width 0.21 mm (0.20–0.22 mm), based on ten specimens in lactic acid. Ratio of length to width of prosome 1.75:1. Ratio of length of prosome to that of urosome 1.53:1.

Segment of leg 5 (Figure 3*e*) 28 × 51 μm.

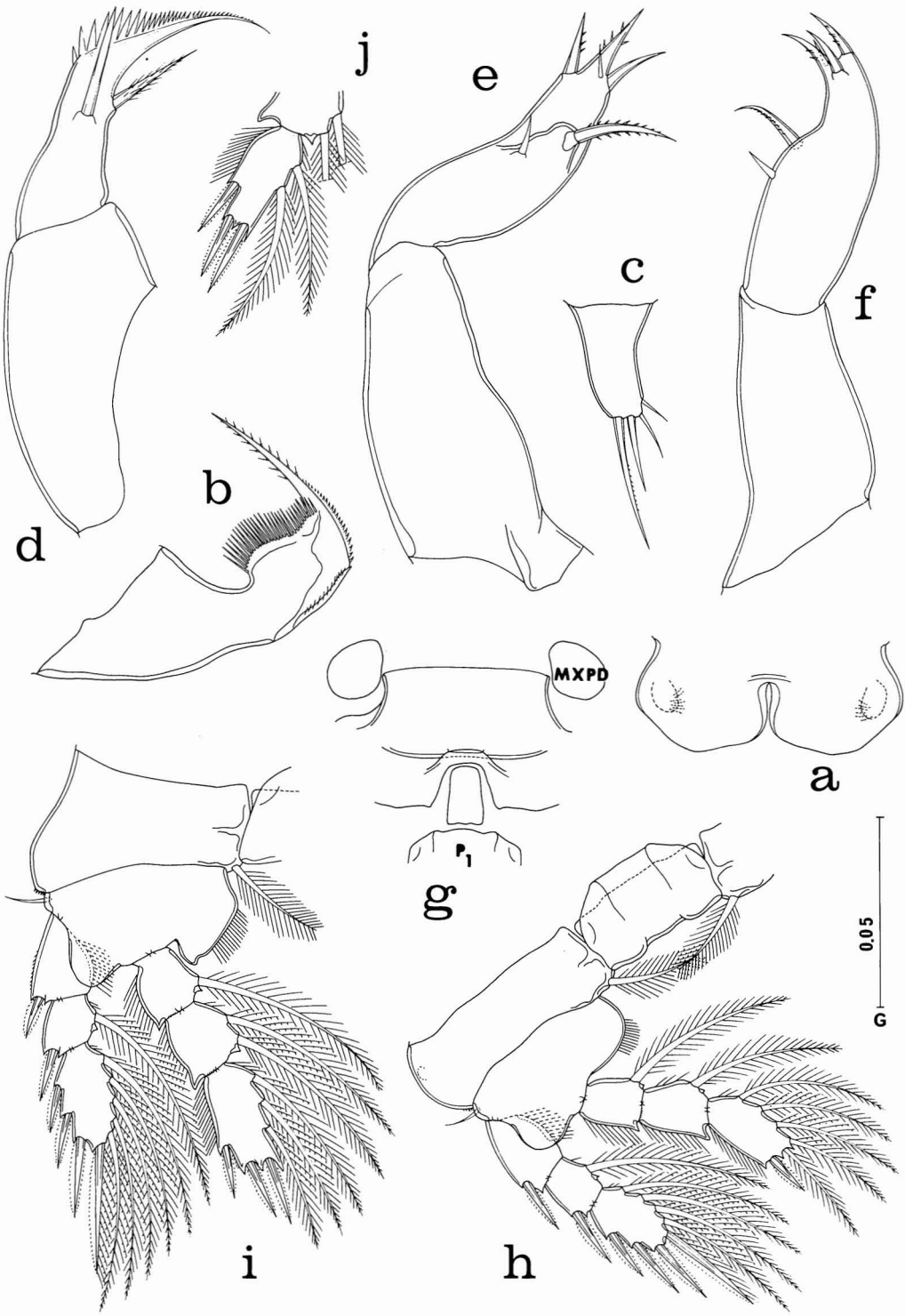

FIGURE 2. *Macrochiron angulare* n. sp. Female: *a*, labrum, with position of paragnaths indicated by broken lines, ventral (G); *b*, mandible, posterior (F); *c*, first maxilla, posterior (C); *d*, second maxilla, posterior (C); *e*, maxilliped, antero-inner (C); *f*, maxilliped, posteroventral (C); *g*, area between maxillipeds and first pair of legs, ventral (B); *h*, leg 1 and intercoxal plate, anterior (F); *i*, leg 2, anterior (F); *j*, third segment of endopod of leg 3, anterior (F).

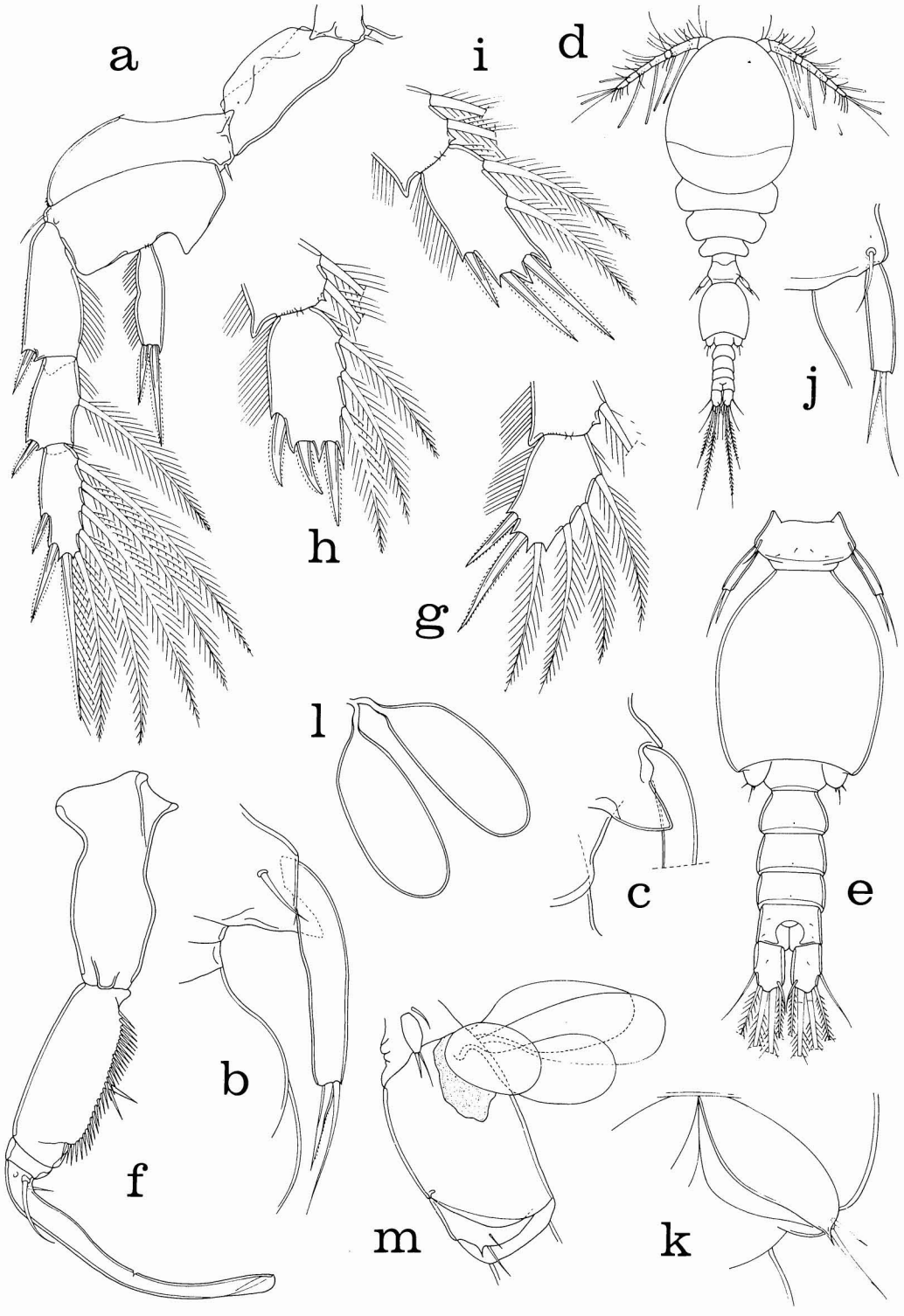

FIGURE 3. *Macrochiron angulare* n. sp. Female: *a*, leg 4 and intercoxal plate, anterior (F); *b*, leg 5, dorsal (G); *c*, process on body near leg 5, ventral (G). Male: *d*, dorsal (A); *e*, urosome, dorsal (B); *f*, maxilliped, postero-inner (F); *g*, third segment of endopod of leg 1, anterior (G); *h*, third segment of endopod of leg 2, anterior (G); *i*, third segment of endopod of leg 3, anterior (G); *j*, leg 5, dorsal (G); *k*, leg 6, ventral (G); *l*, spermatophores, attached to female, ventral (B); *m*, four spermatophores attached to genital segment of male, lateral (B).

Genital segment 104 × 86 μm, a little longer than wide. Four postgenital segments from anterior to posterior 22 × 37, 21 × 35, 19 × 35, and 22 × 34 μm.

Caudal ramus resembling that of female but smaller, 24 × 15.5 μm. Ratio 1.56:1.

Body surface with a few hairs and refractile points as in female.

Rostrum like that of female.

First antenna similar to that of female, but three aesthetes added, two on second segment and one on fourth segment (at points indicated by dots in Figure 1*h*), so that formula is 4, 13 + 2 aesthetes, 6, 3 + 1 aesthete, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete.

Second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla as in female. Maxilliped (Figure 3*f*) resembling that of *M. vervoorti*. Claw 109 μm along axis.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and having same spine and setal formula except for third segment of endopod of leg 1, which is I, I, 4 (Figure 3*g*). Slight sexual dimorphism in relative lengths of spines in third segment of endopod of leg 2 (Figure 3*h*) and leg 3 (Figure 3*i*). Leg 4 as in female.

Leg 5 (Figure 3*j*) with free segment 28 × 7 μm. Ratio 4:1. Body segment carrying leg 5 lacking pointed process seen in female near insertion of free segment of leg.

Leg 6 (Figure 3*k*) a posteroventral flap on genital segment bearing two naked setae 12 μm and 24 μm.

Spermatophores (Figure 3*l*) attached to female in pairs, approximately 94 × 42 μm, not including neck. One male with two pairs of spermatophores attached to anterodorsal surface of genital segment (Figure 3*m*). Similar "homosexual" attachment of spermatophores previously observed in *Vahinius petax* Humes, 1967 (Humes 1969).

Living specimens colored as in female.

Etymology

The specific name *angulare* (in Latin meaning having corners or angles) alludes to the pointed processes on the body segment bearing leg 5 in the female.

Remarks

Five species of *Macrochiron* differ from *M. angulare* in having the formula III, I, 5 on the third exopod segment of leg 4; these are *M. echinicolum* Humes & Stock, 1973; *M. lytocarpi* Humes, 1966; *M. lobatum* Humes & De Maria, 1969; *M. mutatum* Stock, 1957; and *M. sargassi* Sars, 1916. The remaining seven species have the formula II, I, 5 on this segment. Each of these may be differentiated from *M. angulare* by the following features:

Macrochiron avirostrum Morris, 1973. Length of male 0.90 mm; caudal ramus 1.8:1; rostrum with subconical beaklike process with sharp terminal point projecting posteroventrally (female unknown).

Macrochiron cheliferum (Thompson & A. Scott, 1903); *M. fucicolum* Brady, 1872; *M. hudsoni* Morris, 1973; *M. rostratum* Humes, 1966; *M. valgum* Humes, 1966; and *M. vervoorti* Humes & De Maria, 1966. All lacking the pair of pointed processes near leg 5 in the female as seen in the new species.

Macrochiron angulare appears to be close to *M. vervoorti*, an associate of *Aglaophenia cupressina* in Madagascar. Features in addition to the form of the processes on the body segment bearing leg 5 whereby these two species may be distinguished are the shape of the female genital segment, the nature of the median posteroventral process on the rostrum, the relative length of the female maxilliped, and the nature of the two spines on the third endopod segment of the male.

Macrochiron cheliferum
(Thompson & A. Scott, 1903)

Figures 4–6.

Material Studiea (*all from the hydroid Aglaophenia cupressina* Lamouroux)

In 3 meters, 6 ♀♀, 3 ♂♂, southwestern shore of Goenoeng Api, Banda Islands, 4°31′45″ S, 129°51′55″ E, 4 May 1975; 1 ♀, 2 ♂♂, in 2 meters, Parang Island, northeastern Ceram, 3°17′00″ S, 130°44′48″ E, 23 May 1975. Specimens have been deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

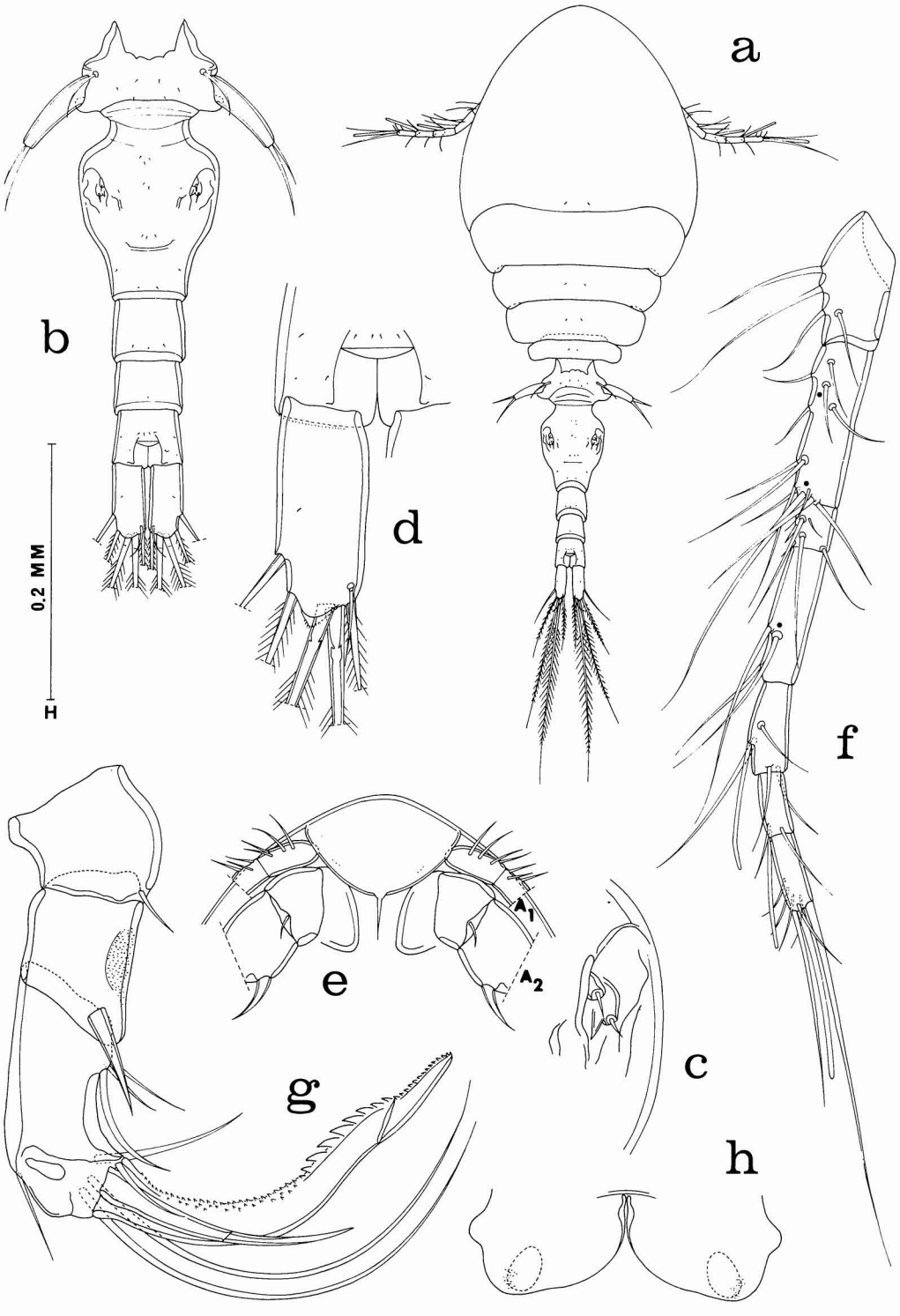

FIGURE 4. *Macrochiron cheliferum* (Thompson & A. Scott, 1903). Female: *a*, dorsal (A); *b*, urosome, dorsal (H); *c*, genital area, dorsal (G); *d*, caudal ramus, dorsal (G); *e*, rostrum, ventral (H); *f*, first antenna, with three dots indicating positions of aesthetes added in male, ventral (F); *g*, second antenna, inner (F); *h*, labrum, with position of paragnaths indicated by broken lines, ventral (G).

Female

Body (Figure 4*a*) with moderately broad prosome. Length 0.89 mm (0.86–0.97 mm) and greatest width 0.37 mm (0.34–0.40 mm), based on seven specimens in lactic acid. Weak transverse dorsal furrow between cephalosome and segment of leg 1. Ratio of length to width of prosome 1.46:1. Ratio of length of prosome to that of urosome 1.46:1.

Segment of leg 5 (Figure 4*b*) 65 × 104 μm. Genital segment 130 × 101 μm, longer than wide, in dorsal view its anterolateral margins somewhat angular at broadest part of segment. Genital areas located dorsolaterally just posterior to broadest part. Each area (Figure 4*c*) bearing two small naked setae about 8 μm and a spiniform process. Three postgenital segments from anterior to posterior 42 × 50, 36 × 49, and 39 × 49 μm. Posteroventral margin of anal segment bearing minute spinules.

Caudal ramus (Figure 4*d*) elongate, 55 × 23 μm. Ratio of length to width 2.39:1. Outer lateral seta 73 μm and dorsal seta 44 μm, both smooth. Outermost terminal seta 101 μm, innermost terminal seta 83 μm, and two long median terminal setae 170 μm (outer) and 245 μm (inner), both inserted between dorsal smooth flange and ventral flange with marginal row of very small spinules; all four setae with lateral spinules.

Body surface with a few hairs (sensilla).

Egg sac unknown.

Rostrum (Figure 4*e*) broad with a long median needlelike point on posteroventral margin.

First antenna (Figure 4*f*) 253 μm long. Lengths of seven segments (measured along their posterior nonsetiferous margins): 21 (47 μm along anterior margin), 57, 17, 49, 32, 22, and 29 μm, respectively. Formula for armature as in *M. angulare*. All setae naked.

Second antenna (Figure 4*g*) 169 μm long (without claws), three-segmented. Formula: 1, 1, 3, 2 claws + 5. Second segment ornamented on inner surface with minute spinules and bearing a seta much stouter than that on first segment. Third segment 99 μm in greatest length. Two terminal claws unequal. Concave margin of larger claw (140 μm along its axis) with proximal field of many small spines followed by single row of large teeth and beyond distal joint another row of smaller teeth. Inner claw (90 μm) slender, smooth, and jointed midway. All setae naked.

Labrum (Figure 4*h*) with two broad posteroventral lobes.

Mandible (Figure 5*a*), paragnath, first maxilla (Figure 5*b*), and second maxilla (Figure 5*c*) resembling those of *M. valgum* Humes, 1966. Maxilliped (Figure 5*d*) also similar to that in *M. valgum*, but second segment slightly longer.

Ventral area between maxillipeds and first pair of legs (Figure 5*e*) similar to that in *M. valgum*.

Legs 1–4 (Figure 5*f, g, h, i*) with the same segmentation and spine and setal formula as in *M. angulare*. Inner coxal seta on leg 4 small, 10 μm, and naked. Leg 4 exopod 120 μm long, third segment with II, I, 5. Endopod 34 × 10 μm and unornamented. Outer terminal element 17.5 μm and weak. Inner element 45 μm and stronger, with minute outer barbules.

Leg 5 (Figure 6*a*) with unornamented free segment 65 × 15.5 μm. Ratio of length to width 4.19:1. Two terminal setae 55 μm and 40 μm, both minutely barbed. Dorsal seta smooth. Ventrally near insertion of free segment body forming a small rounded lobe (Figure 6*b*).

Leg 6 represented by two setae on genital area (Figure 4*c*).

Color in living specimens in transmitted light opaque gray, eye red, egg sacs gray.

Male

Body (Figure 6*c*) with prosome less tapered anteriorly than in female. Length 0.75 mm (0.70–0.80 mm) and greatest width 0.26 mm (0.24–0.29 mm), based on five specimens in lactic acid. Ratio of length to width of prosome 1.68:1. Ratio of length of prosome to that of urosome 1.41:1.

Segment of leg 5 (Figure 6*d*) 36 × 75 μm. Genital segment 143 × 122 μm, a little longer than wide. Four postgenital segments from anterior to posterior 34 × 47, 34 × 45, 29 × 43, and 36 × 44 μm.

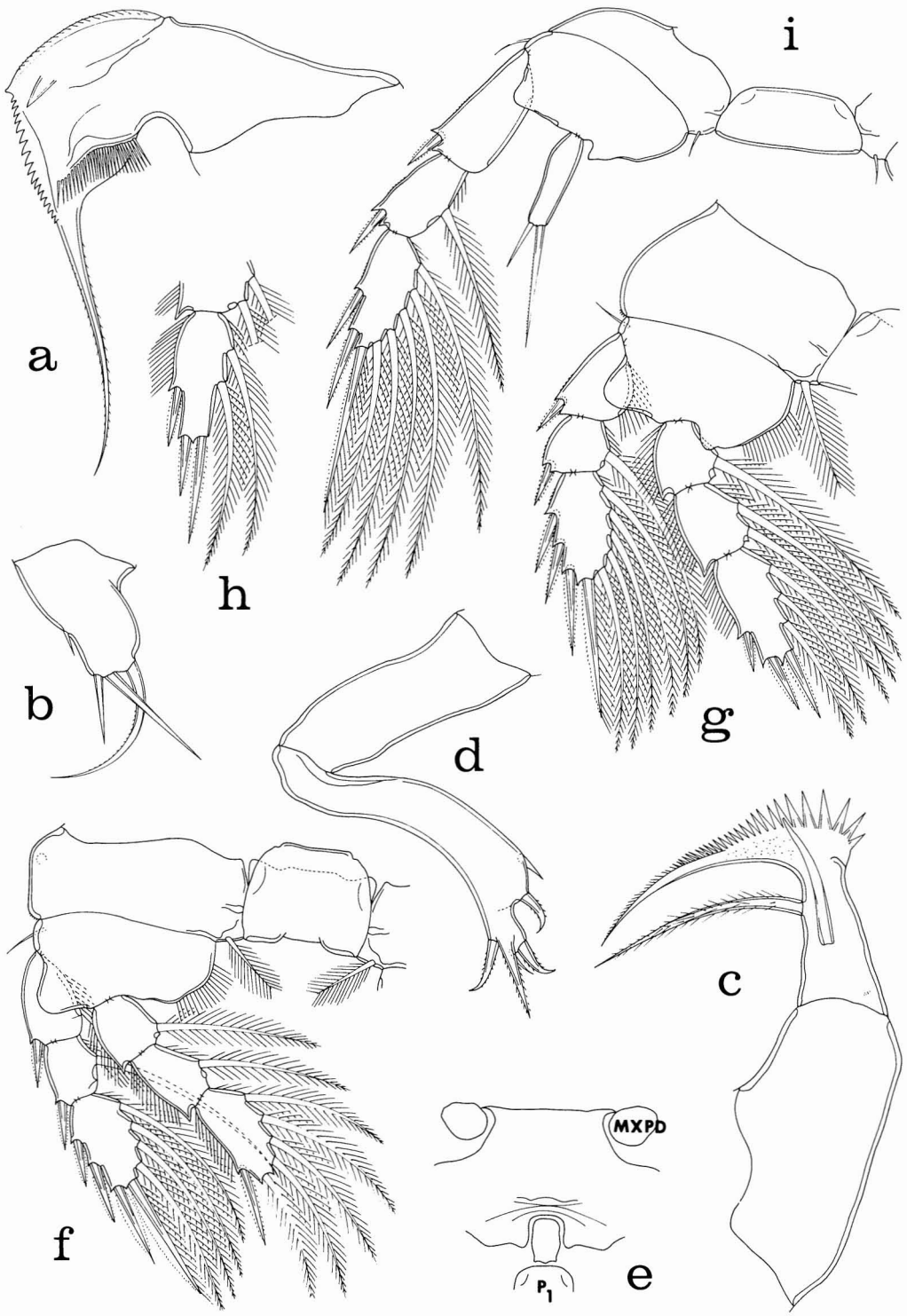

FIGURE 5. *Macrochiron cheliferum* (Thompson & A. Scott, 1903). Female: *a*, mandible, posterior (C); *b*, first maxilla, ventral (C); *c*, second maxilla, posterior (C); *d*, maxilliped, antero-inner (G); *e*, area between maxillipeds and first pair of legs, ventral (H); *f*, leg 1 and intercoxal plate, anterior (F); *g*, leg 2, anterior (F); *h*, third segment of endopod of leg 3, anterior (F); *i*, leg 4 and intercoxal plate, anterior (F).

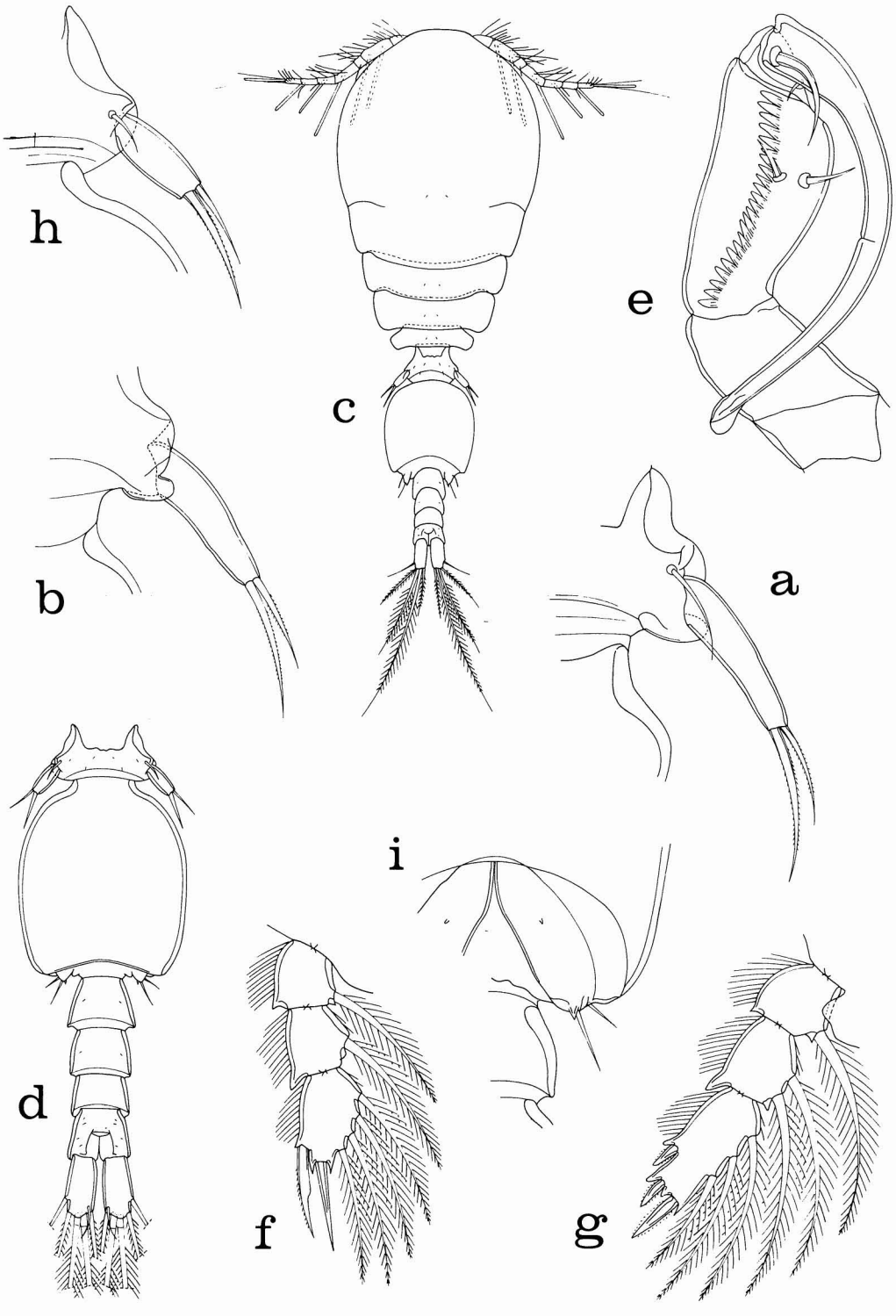

FIGURE 6. *Macrochiron cheliferum* (Thompson & A. Scott, 1903). Female: *a*, leg 5, dorsal (F); *b*, leg 5, ventral (F). Male: *c*, dorsal (A); *d*, urosome, dorsal (H); *e*, maxilliped, postero-inner (G); *f*, endopod of leg 1, anterior (F); *g*, endopod of leg 2, anterior (F); *h*, leg 5, dorsal (G); *i*, leg 6, ventral (F).

Caudal ramus similar to that in female but smaller, 47 × 22 μm. Ratio 2.14:1.

Body surface sparsely ornamented with hairs (sensilla).

Rostrum as in female. First antenna like that of female, but three long aesthetes added (at points indicated by dots in Figure 4*f*), so that formula is same as in male of *M. angulare*.

Second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla resembling those of female. Maxilliped (Figure 6*e*) with first segment and small third segment unarmed. Second segment with row of stout spines and two naked setae. Claw 107 μm along its axis, partly divided midway, and bearing proximally two very unequal naked setae.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and having same spine and setal formula except for third segment of endopod of leg 1, which is I, I, 4 (Figure 6*f*). Three spines on third segment of endopod of leg 3 (Figure 6*g*) shorter than in female, 11, 12, and 21 μm from outer to inner (in female these spines 11, 18.5, and 25 μm). Legs 3 and 4 like those of female.

Leg 5 (Figure 6*h*) with free segment 26 × 11 μm; its two setae 32 μm and 24 μm.

Leg 6 (Figure 6*i*) a posteroventral flap on genital segment bearing two naked setae 22 μm and 13 μm.

Spermatophore not seen.

Living specimens colored as in female.

Remarks

The descriptions and figures of *Macrochiron cheliferum* available in the literature are in many respects incomplete. The original description (as *Pseudanthessius chelifer*) by Thompson and Scott (1903) lacks many details, but even so the general similarity of their Ceylonese species (females only, no host given) with the Moluccan material is evident. Unfortunately Thompson and Scott's specimens are no longer in existence (Humes and Ho 1967:209) and therefore cannot be compared with the present specimens.

The species was briefly noted by Gurney (1927) on the basis of one male from the Suez Canal (no host given). A more detailed description by Vervoort (1964), based on both sexes from Ifaluk Atoll (no host given, but apparently from a hydroid), provided additional details. In none of these partial descriptions are there features inconsistent with the Moluccan specimens.

A direct comparison of the Moluccan specimens with Vervoort's specimens of *M. cheliferum* from Ifaluk Atoll (USNM 109764) has confirmed that they represent the same species.

Macrochiron lobatum Humes & De Maria, 1969

Material Collected

From two small colonies of *Lytocarpus balei* Nutting, 24 ♀♀, 19 ♂♂, and 16 copepodids in 10 meters, Gomumu Island, south of Obi, Moluccas, 1°50′00″ S, 127°30′54″ E, 30 May 1975.

Lytocarpus balei is a new host for *M. lobatum*, previously known only from *L. phoeniceus* (Busk) in Madagascar.

A comparison of the Moluccan specimens with paratypes of *M. lobatum* has shown no important differences, though the copepods from the Moluccas have a somewhat smaller body size. The measurements of ten specimens in lactic acid were: female, length 0.84 mm (0.79–0.88 mm), male, 0.76 mm (0.72–0.79 mm). In *M. lobatum* the length of the female is 1.09 mm (1.01–1.13 mm) and of the male 0.93 mm (0.89–0.97 mm). The smaller body size is reflected in slightly smaller body parts such as the caudal ramus. Such size difference may be related to the different hosts. The very close similarities in the body form and the appendages support the determination of the Moluccan specimens as *M. lobatum*.

Macrochiron lytocarpi Humes, 1966

Material Collected

From eight small colonies of *Lytocarpus philippinus* (Kirchenpauer), 1 ♂, 1 copepodid

in 2 meters, Rocher à la Voile, Noumea, New Caledonia, 22°18′24″ S, 166°25′50″ E, 2 June 1971; 1 ♀, 1 ♂, and 5 copepodids from three colonies of the same host, in 1 m, Rocher à la Voile, Noumea, 2 August 1971.

This represents a range extension from Madagascar, where *M. lytocarpi* is known from the same host.

Macrochiron rostratum Humes, 1966

Material Collected

From eight small colonies of *Lytocarpus philippinus* (Kirchenpauer), 2 ♀♀ in 2 meters Rocher à la Voile, Noumea, New Caledonia, 22°18′24″ S, 166°25′50″ E, 2 June 1971.

This species has previously been known only from Madagascar, where it occurs on the same host.

Macrochiron valgum Humes, 1966

Material Collected

From *Aglaophenia cupressina* Lamouroux, 3 ♀♀ in 2 meters, Parang Island, eastern Ceram, 3°17′00″ S, 130°44′48″ E, 23 May 1975; 1 ♀, 2 ♂♂ from the same host, in 3 meters, southwestern shore of Goenoeng Api, Banda Islands, 4°31′45″ S, 129°51′55″ E, 4 May 1975.

M. valgum has been known previously only from Madagascar on *Lytocarpus philippinus*, *Gymnangium hians*, and *G. gracilicaulis*. The Moluccan specimens represent both a new host record and a range extension.

Macrochiron vervoorti Humes & De Maria, 1969

Material Collected

From *Aglaophenia cupressina* Lamouroux, 38 ♀♀, 38 ♂♂ in 3 meters, Karang Mie, eastern Halmahera, 0°20′07″ N, 129°25′00″ E, 19 May 1975; 74 ♀♀, 124 ♂♂ from the same host, in 2 meters, Parang Island, eastern Ceram, 3°17′00″ S, 130°44′48″ E, 23 May 1975.

This species has previously been known only from Madagascar on the same host.

Genus *Telestacicola* Humes & Stock, 1972

Telestacicola sertus n. sp.

Figures 7–9.

Type Material

From the hydroid *Aglaophenia cupressina* Lamouroux, 19 ♀♀, 46 ♂♂, and 1 copepodid in 3 meters, southwestern shore of Goenoeng Api, Banda Islands, 4°31′45″ S, 129°51′55″ E, 4 May 1975. Holotype ♀, allotype, and 60 paratypes (16 ♀♀, 44 ♂♂) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; the remaining paratypes (dissected) in the collection of the author.

Other Specimens (all from Aglaophenia cupressina)

In 4 meters, 1 ♂, 3 copepodids, Marsegoe Island, western Ceram, 2°59′30″ S, 128°03′30″ E, 15 May 1975; 2 ♀♀, 14 ♂♂, in 3 meters, Karang Mie, eastern Halmahera, 0°20′07″ N, 128°25′00″ E, 19 May 1975; 6 ♀♀, 4 ♂♂, in 2 meters, Parang Island, eastern Ceram, 3°17′00″ S, 130°44′48″ E, 23 May 1975.

Female

Body (Figure 7*a*) with moderately broad prosome. Length 0.95 mm (0.88–1.03 mm) and greatest width 0.35 mm (0.33–0.37 mm), based on ten specimens in lactic acid. Segment of leg 1 separated from cephalosome by dorsal transverse furrow. Ratio of length to width of prosome 1.59:1. Ratio of length of prosome to that of urosome 1.59:1.

Segment of leg 5 (Figure 7*b*) 68 × 117 μm. Genital segment 164 μm long, 104 μm in greatest width, and 69 μm wide just posterior to the lateral indentations. Genital areas situated dorsally anterior to middle of segment. Each genital area (Figure 7*c*) bearing two small naked setae about 5.5 μm and an inconspicuous spiniform process. Three postgenital segments from anterior to posterior 55 × 60, 39 × 55, and 49 × 58 μm. Posteroventral margin of anal segment with a few minute spinules.

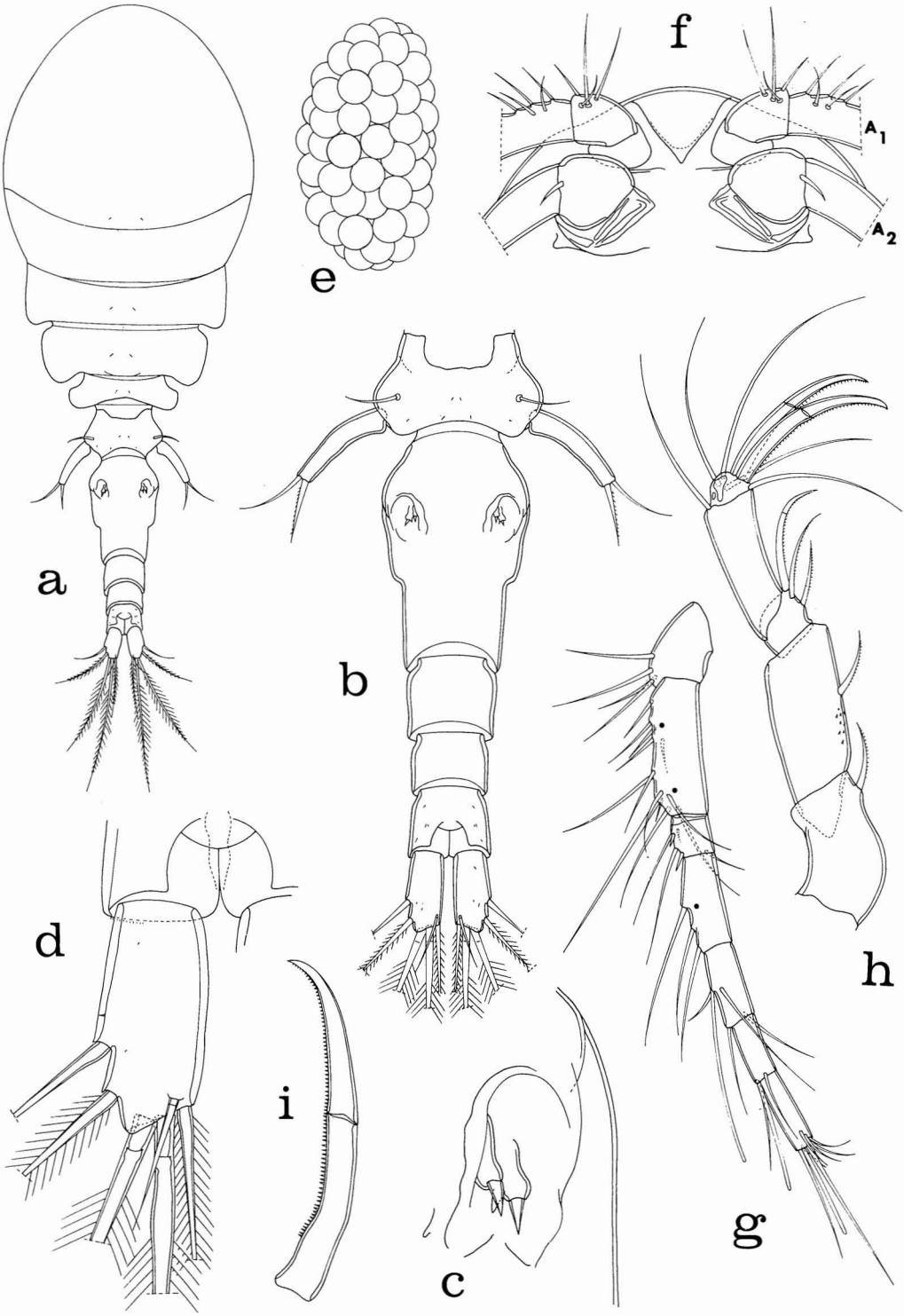

FIGURE 7. *Telestacicola sertus* n. sp. Female: *a*, dorsal (A); *b*, urosome, dorsal (H); *c*, genital area, dorsal (C); *d*, caudal ramus, dorsal (G); *e*, egg sac, lateral (A); *f*, rostrum, ventral (B); *g*, first antenna, ventral (B); *h*, second antenna, posterior (B); *i*, claw of second antenna, anterior (G).

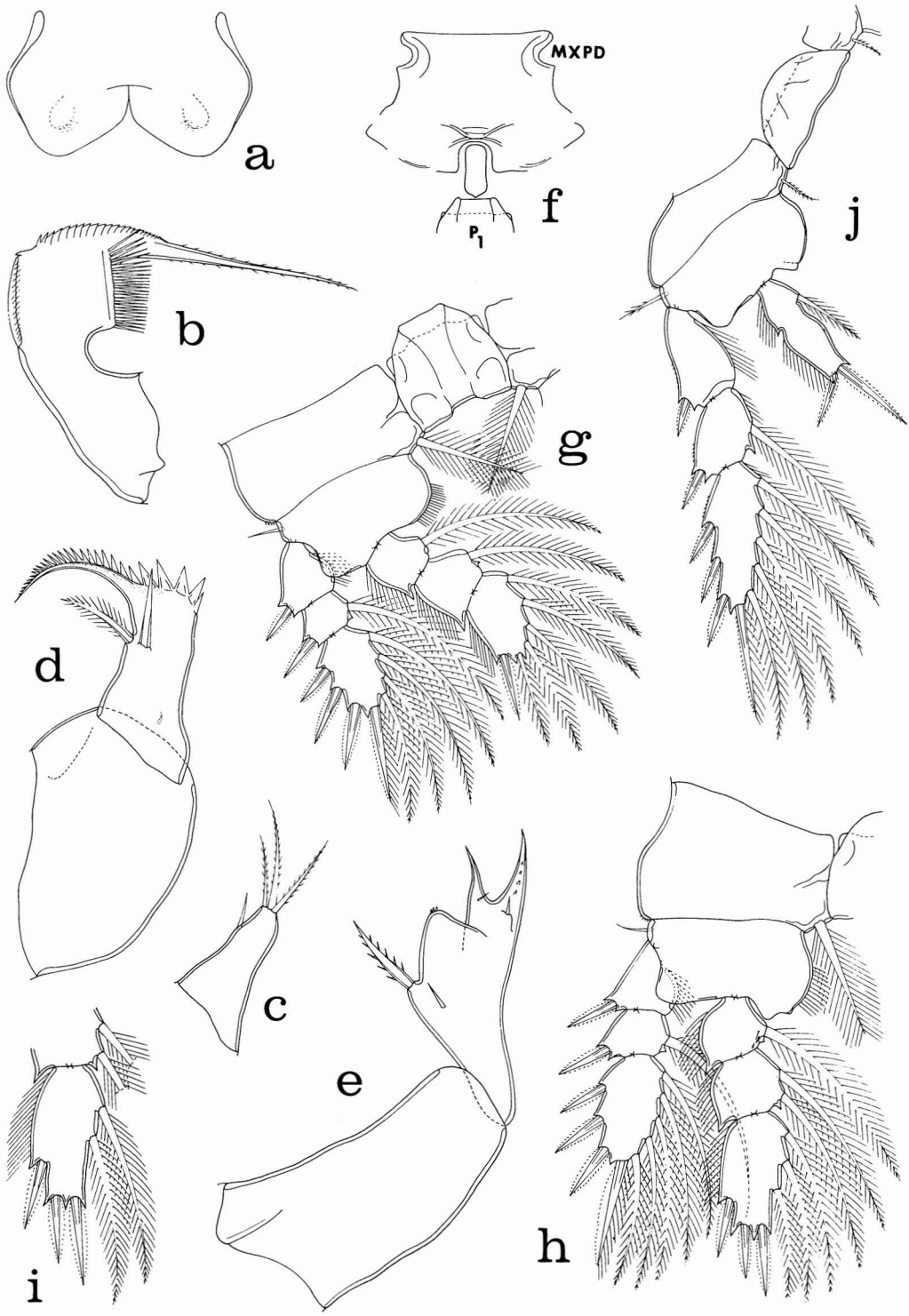

FIGURE 8. *Telestacicola sertus* n. sp. Female: *a*, labrum, with position of paragnaths indicated by broken lines, ventral (F); *b*, mandible, posterior (G); *c*, first maxilla, posterior (G); *d*, second maxilla, posterior (G); *e*, maxilliped, antero-inner (G); *f*, area between maxillipeds and first pair of legs, ventral (H); *g*, leg 1 and intercoxal plate, anterior (B); *h*, leg 2, anterior (B); *i*, third segment of endopod of leg 3, anterior (B); *j*, leg 4 and intercoxal plate, anterior (B).

Caudal ramus (Figure 7*d*) elongate, 57 × 28 μm. Ratio of length to width 2.04:1. Outer lateral seta 78 μm and dorsal seta 35 μm, both smooth. Outermost terminal seta 117 μm, innermost terminal seta 112 μm, and two long median terminal setae 187 μm (outer) and 242 μm (inner), both with lateral spinules and inserted between dorsal (smooth) and ventral (with few extremely small marginal spinules) flanges; all four setae with lateral spinules.

Body surface with a few hairs (sensilla).

Egg sac (Figure 7*e*) elongate oval, 374 × 210 μm, containing many eggs and extending well beyond caudal rami. Each egg about 49 μm in diameter.

Rostrum (Figure 7*f*) pointed and beaklike.

First antenna (Figure 7*g*) 280 μm long. Lengths of seven segments (measured along their posterior nonsetiferous margins): 15 (42 μm along anterior margin), 68, 21, 47, 37, 27, and 38 μm, respectively. Formula for armature: 4, 13, 6, 3, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All setae naked.

Second antenna (Figure 7*h*) 231 μm long not including claws, four-segmented. Formula: 1, 1, 3, 2 claws + 5. Setae on first three segments finely barbed along one side; longest seta on third segment jointed. Second segment with inner group of very small spines proximal to seta. Fourth segment 83 μm along outer edge, 57 μm along inner edge, and 21 μm wide at middle, bearing terminally five long slender smooth setae and two slender jointed claws 83 μm along axis and pectinate along concave side (Figure 7*i*).

Labrum (Figure 8*a*) with two broad posteroventral lobes.

Mandible (Figure 8*b*) with long lash. Paragnath a small lobe with a few hairs. First maxilla (Figure 8*c*) with three terminal haired setae and one smaller subterminal smooth seta. Second maxilla (Figure 8*d*) with second segment bearing a small setule proximally on anterior surface, a smooth seta on posterior surface, and an inner barbed seta. Lash with coarse teeth proximally and more slender teeth distally; these two groups separated by a few shorter teeth. Maxilliped (Figure 8*e*) apparently two-segmented, with no clear articulation between second and third segments. Second segment greatly expanded inwardly and bearing two very unequal setae; larger seta with strong lateral spinules, smaller seta naked. Third segment bearing two small naked setae and terminating in two spinelike processes, one of them with bilateral barbs.

Ventral area between maxillipeds and first pair of legs (Figure 8*f*) slightly protuberant.

Legs 1–4 (Figure 8*g*, *h*, *i*, *j*) segmented as in *Telestacicola angoti* Humes & Stock, 1973. Details of armature of legs 1–3 very similar to that species. Leg 4 (Figure 8*j*) with exopod 153 μm long and third segment having formula III, I, 5. Endopod a single segment 55 μm long without spiniform processes (57 μm long with these processes) and 19 μm in greatest width. Two terminal fringed spines 28 μm (outer) and 41 μm (inner). Feathered seta on inner margin of segment 31 μm. Outer margin with a thornlike process nearly opposite inner seta and bearing long hairs. Inner coxal seta 19 μm and delicately feathered.

Leg 5 (Figure 9*a*) with unornamented free segment 78 × 15.5 μm (width at middle). Ratio 5.03:1, with slight inner proximal expansion (width here 18 μm). Inner terminal seta 38 μm and barbed; outer terminal seta 40 μm and smooth. Smooth dorsal seta approximately 30 μm, but held erect and difficult to measure accurately.

Leg 6 represented by two setae on genital area (Figure 7*c*).

Color in living specimens opaque gray, eye red, egg sacs gray.

Male

Body (Figure 9*b*) with slender prosome. Length 0.73 mm (0.69–0.78 mm) and greatest width 0.22 mm (0.20–0.23 mm), based on ten specimens in lactic acid. Ratio of length to width of prosome 1.79:1. Ratio of length of prosome to that of urosome 1.27:1.

Segment of leg 5 (Figure 9*c*) 42 × 68 μm. Genital segment elongate, 180 × 143 μm. Four postgenital segments from anterior to posterior 26 × 45, 26 × 44, 18 × 42, and 27 × 45 μm.

Caudal ramus (Figure 9*d*) 34 × 21 μm.

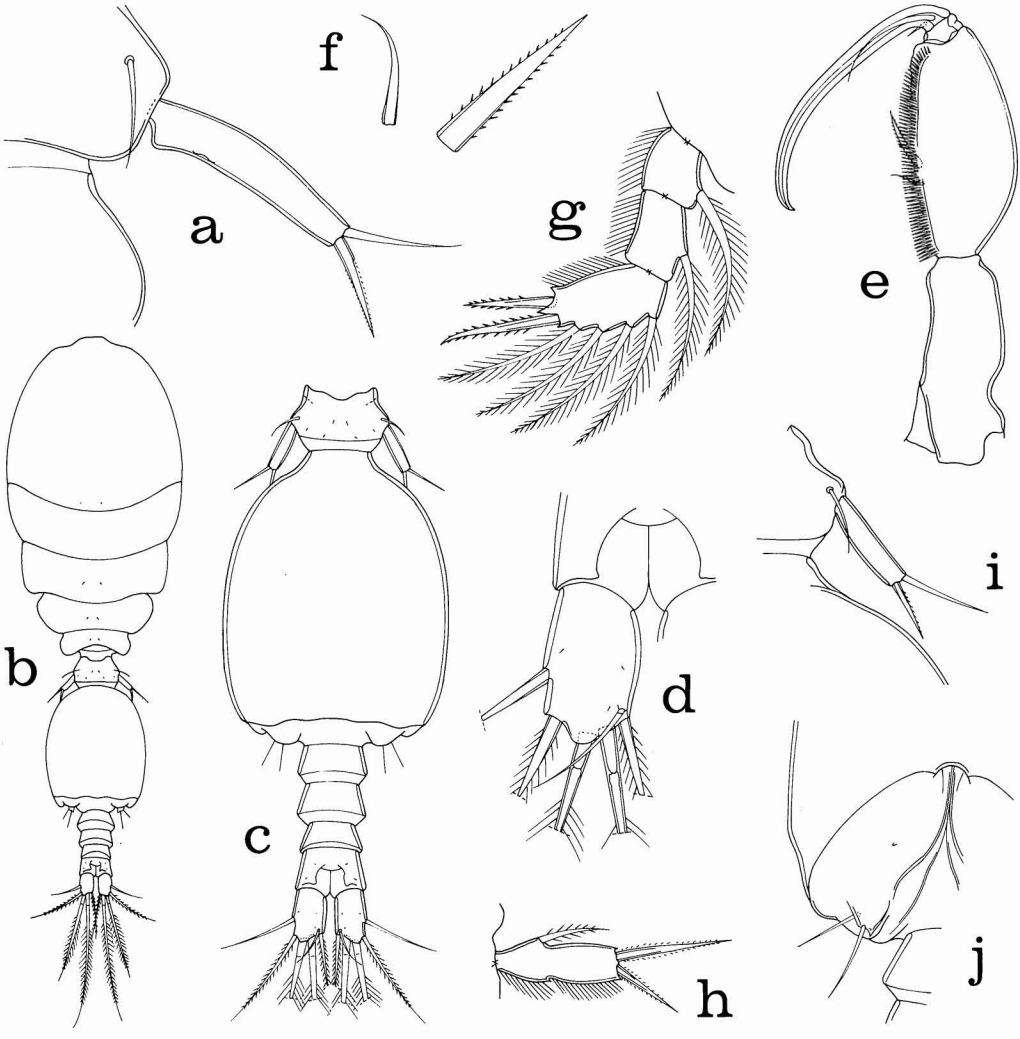

FIGURE 9. *Telestacicola sertus* n. sp. Female: *a*, leg 5, dorsal (F). Male: *b*, dorsal (A); *c*, urosome, dorsal (H); *d*, caudal ramus, dorsal (G); *e*, maxilliped, inner (B); *f*, two setae on second segment of maxilliped, outer (C); *g*, endopod of leg 1, anterior (F); *h*, endopod of leg 4, anterior (F); *i*, leg 5, dorsal (F); *j*, leg 6, ventral (B).

Ratio about 1.6:1. Relatively shorter than in female but similarly armed.

Body surface with hairs as in female.

Rostrum as in female. First antenna as in female but three long aesthetes added (at points indicated by dots in Figure 7*g*). Formula: 4, 13 + 2 aesthetes, 6, 3 + 1 aesthete, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete.

Second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla as in female. Maxilliped (Figure 9*e*) with unarmed first segment. Second segment bearing a row of long spinules and two very dissimilar setae (Figure 9*f*), one stout and barbed, the other slender and smooth. Small third segment unarmed. Claw 112 μm along its axis, with two very unequal, smooth setae proximally and lacking a terminal lamella.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1–4 segmented as in female and with similar armature except for dimorphism in third segment of endopod of leg 1 where

TABLE 1

PRINCIPAL DISTINGUISHING FEATURES OF *Telestacicola angoti* AND *T. sertus*

T. angoti	*T. sertus*
Rostrum linguiform, tip rounded	Rostrum beaklike, tip pointed
Claws on A_2 coarsely dentate	Claws on A_2 finely pectinate
Lash on mx_2 with uniform small teeth	Lash on MX_2 with teeth of two sizes
♀ MXPD three-segmented	♀ MXPD with second and third segments united
P_4 Exp third segment with II, I, 5	P_4 Exp third segment with III, I, 5
P_4 Enp without thorn on outer margin	P_4 Enp with thornlike process on outer margin
♀ P_5 with pronounced inner proximal expansion	♀ P_5 with slight inner proximal expansion
♀ caudal ramus 98 × 20 μm, 4.8:1	♀ caudal ramus 57 × 28 μm, 2.04:1

formula is I, I, 4 (Figure 9*g*). Endopod of leg 4 (Figure 9*h*) 39 × 13 μm, terminal spines 18 μm (outer) and 29 μm (inner).

Leg 5 (Figure 9*i*) with free segment 31 × 9 μm. Ratio 3.44:1. Shorter than in female and without inner proximal expansion.

Leg 6 (Figure 9*j*) a posteroventral flap on genital segment bearing two slender smooth setae 30 μm and 32 μm.

Spermatophore not seen.

Living specimens colored as in female.

Etymology

The specific name *sertus* (Latin meaning joined together) refers to the apparent union of the second and third segment of the second maxilla of the female.

Remarks

At present the genus *Telestacicola* Humes & Stock, 1972, contains only one species, *T. angoti* Humes & Stock, 1973, associated with the telestacean *Coelogorgia palmosa* Milne Edwards & Haime and with the gorgonacean *Muricella rubra robusta* J. A. Thompson & J. Simpson in Madagascar. The salient differences between *T. angoti* and *T. sertus* are shown in Table 1.

REMARKS ON LICHOMOLGID ASSOCIATES OF HYDROIDS

The geographical ranges of copepods on hydroids may be very broad. For example, four species (*Macrochiron lobatum*, *M. lytocarpi*, *M. valgum*, and *M. vervoorti*) occur in Madagascar and in the western Pacific. It seems probable that the various species of *Macrochiron* will be found wherever suitable hydroid hosts live.

A single species of hydroid may harbor more than one species of copepod. *Aglaophenia cupressina* at Parang Island in eastern Ceram serves as host for five species of copepods: *Macrochiron angulare*, *M. cheliferum*, *M. valgum*, *M. vervoorti*, and *Telestacicola sertus*. Since at the time of collection several colonies of this hydroid were combined, it is not known whether the five copepods can coexist on the same colony.

LIST OF LICHOMOLGID COPEPODS ASSOCIATED WITH HYDROIDS

Macrochiron lytocarpi	
with *Lytocarpus philippinus*	Madagascar (Humes 1966)
	New Caledonia (present paper)
Macrochiron valgum	
with *Lytocarpus philippinus*	Madagascar (Humes 1966)
with *Aglaophenia cupressina*	Moluccas (present paper)
with *Gymnangium hians*	Madagascar (Humes and De Maria 1969)
with *Gymnangium gracilicaulis*	Madagascar (Humes and De Maria 1969)

Macrochiron rostratum	
with *Lytocarpus philippinus*	Madagascar (Humes 1966)
	Moluccas (present paper)
with *Lytocarpus phoeniceus* (=*L. spectabilis*)	Madagascar (Humes 1966)
with *Aglaophenia delicatula*	Madagascar (Humes and De Maria 1969)
with *Gymnangium hians*	Madagascar (Humes and De Maria 1969)
with *Gymnangium gracilicaulis*	Madagascar (Humes and De Maria 1969)
Macrochiron lobatum	
with *Lytocarpus phoeniceus*	Madagascar (Humes and De Maria 1969)
with *Lytocarpus balei*	Moluccas (present paper)
Macrochiron vervoorti	
with *Aglaophenia cupressina*	Madagascar (Humes and De Maria 1969)
	Moluccas (present paper)
Macrochiron angulare	
with *Aglaophenia cupressina*	Moluccas (present paper)
Macrochiron cheliferum	
with *Aglaophenia cupressina*	Moluccas (present paper)
Macrochiron fucicolum	
with *Kirchenpaueria pinnata*	England (Hamond 1973)
Macrochiron hudsoni	
probably with *Obelia longissima*	northwest Atlantic, 39°30′ N, 49°30′ W (Morris 1973)
Macrochiron avirostrum	
probably with *Obelia longissima*	northwest Atlantic, 39°30′ N, 49°30′ W (Morris 1973)
Telestacicola sertus	
with *Aglaophenia cupressina*	Moluccas (present paper)

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